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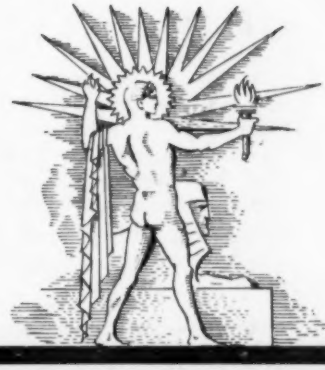
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



June 3, 1939

Aurora in a Jar

See Page 349

A SCIENCE SERVICE PUBLICATION

Do You Know?

Argentina has 44 million sheep and 33 million cattle.

The only successful way of counting antelope is by airplane, wild-life enumerators say.

A photographic record of a fancy diving curve can be made by fastening lights to head, ankles, and back of the diver, and keeping the camera open during the dive.

A farmer who watched his dog chase a gray fox up a tree reports that the fox "used his forefeet to grasp the tree trunk and his hindfeet to scramble upward."

A truck from the National Bureau of Standards is touring the country, testing large scales up to 15,000 pounds by hoisting 1,000 pound weights on a crane and depositing each weight on the scale under test.

Quantities of clothes moths are reared by entomologists, for their experiments with anti-moth preparations,, and these "guinea pig" moths must be uniformly strong and healthy to be good test subjects.

Investigating why baby turkeys are apt to develop rickets when fed on the mash that chicks thrive on, University of California scientists believe the answer is that the young turkey needs ten times as much vitamin D as the young chick does.

Shore birds lay eggs of so nearly triangular shape that four in a nest fit together like a cut pie.

It takes over a million dollars' worth of plate glass to protect the exhibits in Chicago's Field Museum.

There is no stand of California Redwood trees in a National Forest, but a Redwood National Forest is advocated.

Metered air conditioning is a new development: the tenant pays for the cold water used each month, according to his meter record.

A private collection of 2,446 baskets made by women of 112 different Indian tribes has been presented to the Southwest Museum in Los Angeles.

The Cardiff Giant, which many people of the past century considered a petrified man, was actually a hoax object cut out of a block of Iowa gypsum.

Home economists say a varied "skyline" is interesting in a living room, meaning to avoid the monotony of too many furnishings of the same height.

The long shape of Italy and the prevalence of mountain districts are not favorable for good radio reception, says the U. S. Department of Commerce's Electrical Division.

The hole dug for a transplanted tree should be deep and ample, says a Harvard botanist, adding: "It is always better to plant a 50-cent tree in a three-dollar hole than a three-dollar tree in a 50-cent hole."

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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SCIENCE NEWS LETTER

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ENGINEERING

French Streamlined Car Will Run 53 Miles to the Gallon

Automotive Engineering Congress Also Hears Forecast Of Car of the Future With Bed, Plastics, Moving Seats

FRANCE now has a light-weight motor car which can do 53 miles to the gallon of gasoline when running at 30 miles per hour, it was reported to the World Automotive Engineering Congress by French engineers J. Andreau and Charles B. Brull.

At 50 miles an hour it will get 49 miles to the gallon of fuel and 39 miles to the gallon at 70 miles per hour. Even at speeds of 90 miles an hour it attains 27 miles to the gallon of fuel.

This car, a streamlined version of the popular Citroen, seats five people and has a top speed of 93.5 miles an hour. Compared with a stock car having the same motor the streamliner's performance showed half the gasoline consumption coupled with a 45 per cent. increase in speed.

Engineer Andreau is the designer who turned out the body of the famous "Thunderbolt" of Capt. Eyston which holds the world's land speed record of 357.5 miles an hour.

In cars with the new Andreau body the hissing of the wind against the body is completely suppressed, said Mr. Brull, and the driver loses this criterion of speed.

So efficient is the streamlining that the windshield remains completely clear. There is no frontal air pressure upon it to stick mud or insects to the glass panels. Rain drops run from the bottom to the top of the windshield and are instantly scattered so that no wiper is needed.

With this streamlining there is no sidesway due to lateral wind and the stability is so great that the steering wheel has true finger tip control.

The economies achieved with such streamlining, even at ordinary driving speeds, are the engineers' answer in Europe to the severe taxes on motor fuel and the cars.

The tax collector, Mr. Andreau indicated, is in fact the "chief engineer" of all motor cars in European countries. In France there are 15 taxes to worry the motor car owner and driver.

A forecast of the outward appearance of the automobile of the future, which includes movable light chairs instead of fixed seats, a roof covered in part with ultraviolet light transmitting plastic materials, concealed beds and air conditioning, was described at the World Automotive Engineering Congress by Edwin L. Allen of the Standard Products Company.

All this can be done without increasing the height and width of present cars and with only a slight increase in length.

"Streamlining will come eventually, not so much because of its practical value, but because it will be necessary to keep step with our future conception of beauty in motion. Since history began we have always envisioned a pointed arrow shape as indicative of speed. We know now that the arrow was pointed to pierce solid objects and not the air. Thanks to the airplane, the layman's conception of a fast moving object is gradually changing from the point in the front to the point behind. Sooner or later we must give this to him in a car if it is to have grace and indicate speed," Mr. Allen said.

Already the trend to streamlining has come up against the need for better vision in driving and in 1939 vision has won out, Mr. Allen declared.

The production of motor car body panels by pressing sheet steel in huge dies is a roundabout, makeshift method, Mr. Allen indicated.

"We carefully roll steel into a flat sheet and then proceed to wrinkle it up into intricate shapes. What a short cut it would be to inject the liquid metal directly into the finished form," he declared.

It might also be possible to make the body by spraying metal onto mantles and by successive applications build up steel bodies of suitable thickness, he added.

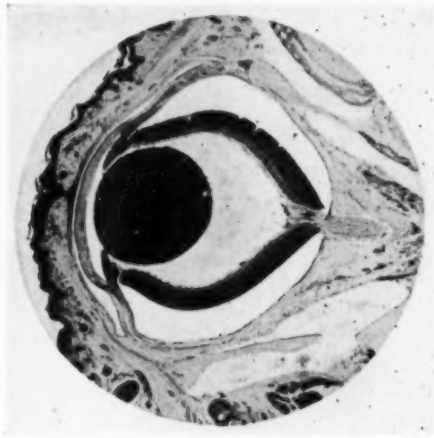
While the changes in the next twenty years in the appearance of the automobile will be many, they may not be as great as those of the previous two decades, Mr. Allen pointed out. Where the public used to be the restraining balance wheel on radical changes in design, the industry itself is coming to show this type of inertia.

Twenty years ago there were some 100 automobile companies each seeking novel designs. The bright ideas of their engineers and designers passed through 100 key executives who made the decisions. A careful gleaning of good improvements in designs each year quickly led to the adoption of the best features.

Today the designers are no less brilliant than they were then but their ideas are now put through a much smaller "funnel" in the minds of executives of a much smaller number of companies, Mr. Allen explained.

The production of a new model means retooling in vast plants and the expenditure of millions of dollars today. Automotive executives cannot afford to take radical chances in body changes with this much at stake. Twenty years ago the costs were much less, per company, and the pressure of competition in developing new advances in body design was greater. The fewer executives today are much more cautious.

Europe, where production is in a larger number of models and in much smaller quantities, said Mr. Allen, may



LIKE A DIAGRAM

The parts of the eye are usually pictured in diagrammatic form, but this low-magnification photomicrograph of an actual sagittal section of the eye of a very young mouse shows all the parts, from the closed eyelids (left) to the thick optic nerve, shown in longitudinal section as it passes into the surrounding tissues of the eye-socket. The large dark circular object is the crystalline lens. Both section and photograph were made at the Catholic University of America by the Rev. John W. Baechle, C. PP. S.

well be the most fruitful proving ground of public opinion for new body design.

Science News Letter, June 3, 1939

"Dope" Diesel Fuels

ENGINEERS and scientists are studying the increased performance of Diesel engine fuel when it is "doped" with acetone peroxide and ethyl nitrate.

The Dutch scientists J. J. Broeze and J. O. Hinze of the Royal Dutch Shell Laboratories showed that the addition of small quantities of these "dopes" makes the firing of the heavy oil in airplane Diesel engines easier. The molecules of the chemical dopes are easily activated and make the combustion of the charge of fuel in the cylinders occur more easily. Aim of the investigation is to retain the safety features of a heavy Diesel fuel and yet raise its firing characteristics.

Science News Letter, June 3, 1939

MEDICINE

Use Television Techniques To Detect Heart Ailments

A NEW kind of electrocardiograph machine using television principles, which will enable doctors to see the record of the patient's heart action instantaneously without waiting as is now necessary for a photographic film to be developed, has been devised by Dr. George Walker of the University of Kansas School of Medicine.

The familiar wavy line record is traced in bright green by a bright moving dot on a screen which is both phosphorescent and fluorescent. The moving dot comes from a stream of electrons from a cathode ray tube.

The machine is expected to save both time and money in getting records of heart action, important for diagnosing about 40 heart conditions.

It can be operated from any electric light socket in either hospital, office or home. It is not yet available commercially. The principle of this new machine has been adapted to use with the standard electrocardiograph machines now in use. This phase of the work was done by Dr. Graham Asher of the University of Kansas.

The exhibit of these machines, shown by Drs. Asher, Walker and Frank Hoecker, at St. Louis, was awarded a certificate of merit by the American Medical Association.

Science News Letter, June 3, 1939

Portugal rules colonies totaling 26 times its own area.

PHYSICS

Metal of the Future Has Extraordinary Stiffness

Beryllium, Now Very Scarce, Would Revolutionize Industry and Aviation If Ever Found in Large Quantity

WRITE this down in your future book: a metal not one person in ten thousand will ever see in pure form outside a museum and whose name you may never have heard is promising to improve the machines of our industries during the next decade.

Speedier, sturdier and safer airplanes driven by far more powerful motors; cheaper and safer machine tools; longer-lasting springs—these and hundreds of other boons may soon be conferred on twentieth century civilization by this metal.

Its name is beryllium. Though its commercial exploitation goes back not many years and its intensive study in the laboratory dates but to the post-war period, already it has aroused man's cupidity and a bitter international battle for its control, with ramifications reaching into the governments of a half dozen major powers.

It is being put into alloys whose performance makes beryllium a strategic material in the World War that has not yet begun, even though the amounts of beryllium in use must still be measured in pounds instead of tons.

A watch made of two alloys containing beryllium was dropped from an airplane 3,000 feet up. Only the crystal broke; the watch continued to run. Properly used springs made of one of the alloys have never broken or worn out from fatigue. Engine parts made of it can operate consistently at temperatures that would ruin the temper and shorten the life of any material now in use.

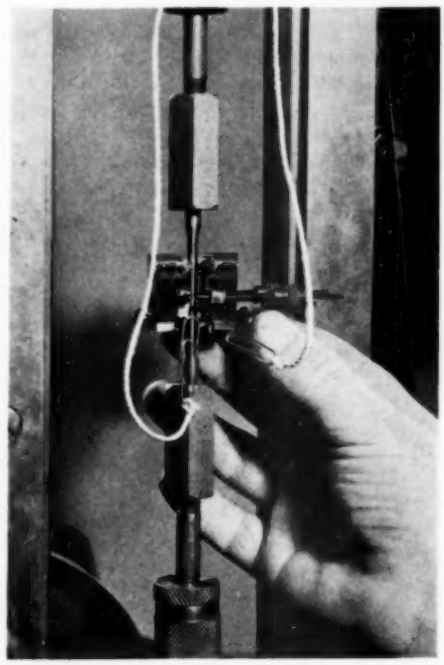
Beryllium is light and exceedingly hard. Added to other metals, it confers on them hardness and strength, turns soft copper into a ruddy alloy as hard as tool steel, with nickel makes an alloy as tough as the toughest steel and much harder. Some beryllium alloys laugh at corrosion as well; they are more rust-resistant than stainless steel.

A Frenchman, Vauquelin, found beryllium in 1798, but because it is difficult to extract from its ore, it remained a curiosity for a century and only the dreamer ever imagined it would some day become an object of painstaking attention. A decade ago, its price was more than $100 per pound of beryllium in the form of a master alloy with copper. Today the four per cent. beryllium master alloy sells for $15 a pound of beryllium —actually about 25 pounds of metal.

Beryllium is the fourth lightest element, only the gases hydrogen and helium, and a still lighter metal whose violent reactions with water make it unusable, lithium, coming before it in the periodic table. Though it is hard and takes a high polish and melts only at a high temperature, it is extremely brittle.

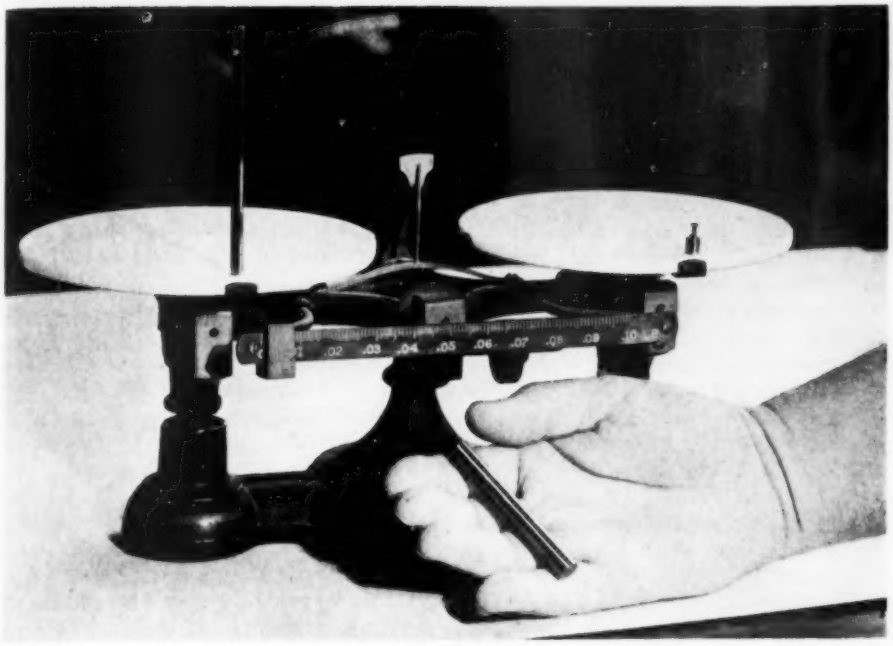
Beryllium copper, containing two per cent. of the new metal and, in some cases, a small percentage of nickel, is the beryllium alloy most widely used so far in the United States.

But in Germany, the giant Siemens-Halske firm has made an alloy of two per cent. beryllium and the rest nickel.



STRENGTH TEST

Beryllium is submitted to tests of tensile strength at the National Bureau of Standards. It is strong, but so little is available that even test samples are below standard in size.



EXTREMELY LIGHT

The sample of beryllium at the left fairly towers over the tiny brass weight which balances it. In the foreground is another tiny sample of the metal from the museum of the U. S. Bureau of Mines.

And from that alloy they have made parts for airplane engines and other parts finding their way into different corners of machine-minded Germany. In this alloy—and in an alloy of beryllium and iron to produce beryllium steel, a secret research project in half a dozen laboratories—there is promise.

Beryllium copper has a tensile strength of 185,000 pounds to the square inch. Beryllium nickel ranges between 260,000 and 300,000 pounds to the square inch! True enough, steels that strong exist, but they do not have beryllium nickel's hardness nor its corrosion resistance. Nor its wonderful property of keeping these same characteristics at temperatures as high as 400 degrees centigrade. Ask any engineer what that means: the airplane engine builder, the high speed Diesel designer and others whose business is rapidly moving machinery that heats up.

Beryllium copper is almost the modern equivalent of the legendary lost art of hardened copper. It may provide cheaper long distance transmission lines because of its great strength and high electrical conductivity.

The other beryllium alloy which may be superior even to beryllium nickel is beryllium-aluminum, consisting roughly of three quarters beryllium and the rest aluminum. Because beryllium is two-thirds the weight of aluminum, the alloy is substantially lighter than any material in use for aircraft structures. Early samples of the alloy were all extremely brittle, but secret projects in which military authorities the world over are keenly interested are said to be overcoming the difficulties.

Great strength far in excess of any usefulness can be had in many metals, but what the scientist calls the modulus-density ratio, that is, stiffness of the metal in relation to its weight, fails in most cases. This explains why some designers look with hungry eyes upon one of beryllium's properties, its enormous stiffness. If only it could be utilized.

Beryllium is normally brittle as glass. But a few small pieces of ductile beryllium have been produced. There are dreams that we shall learn how to make ductile beryllium just as drawn tungsten wire was achieved after being considered impossible for years. If non-brittle beryllium is made, will it retain its wonderful stiffness?

Though its manifold advantages would seem to promise it a rosy future, there are still many difficulties in the way of beryllium's use. Because of the exceptional hardness of its alloys, they are difficult to fabricate. More serious is the question as to where to find enough beryllium ore.

Beryllium is extracted most usually by electrolysis of a molten bath of one of its compounds, derived from beryl. Beryl is a crystalline mineral which in one form is known as emerald and in another as aquamarine. But there are forms of beryl which are not gems.

Beryl itself is not a common ore, although it is widely scattered. Gathering it is still small business and it is done usually only as the by-product of mining for other minerals. About 500 tons of ore a year are sold in the United States.

Much of the present ore is recovered as a by-product of feldspar and mica mines in New Hampshire, North Carolina and Georgia. The beryl-containing scrap heaps of these mines may contain 8 per cent. beryl, with a 2 per cent. beryllium metallic content. Most of the beryllium mining at present consists of picking out beryl crystals which puts production in about the same stage as gold mining by finding nuggets.

So scattered is beryl and so low in concentrations does it occur that the U. S. Geological Survey lists no known reserves of this ore. In a mineral sense it has some aspects of the gold-in-seawater problem; the gold is there in large quantities but in such low concentrations that it cannot profitably be extracted.

Beryllium also occurs in other minerals more common than beryl, but methods of extraction from these sources are not at hand. Despite the seeming paucity of supply, however, engineers and industrialists backing the newcomer in the family of metals are not worried. They point out that we haven't been looking for beryl very long; and they recall that Bartlett Mountain's fabulously rich content of molybdenum, which provides us with some of our finest steels via the alloy method, was long incorrectly labeled graphite.

For the man who can find and develop adequately rich deposits of beryllium there may be a fortune.

Science News Letter, June 3, 1939

The U. S. Biological Survey has a black bear skull believed the biggest on record—13¼ inches long and 8 inches wide.

●RADIO

Dr. G. W. Kenrick, radio engineer and professor of physics at the University of Puerto Rico, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, June 12, 3:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.

PHYSICS

Cosmic Tortoise-Hare Race Origin of "Hard" Rays

A COSMIC "tortoise and hare" race in inter-galactic space is suggested as the origin of the piercing "hard" cosmic radiation which comes down through the earth's atmosphere to strike every person on earth.

In a report to the American Geophysical Union, Dr. Thomas H. Johnson of the Bartol Research Foundation of the Franklin Institute described the tortoise-hare race.

The scientist's picture, simply, is that in the universe there is a source of cosmic rays which is emitting high-speed electrons in a fashion somewhat comparable to the emission of electrons from a vacuum tube filament in a radio set.

These electrons, carrying a negative electrical charge, leave the source of cosmic rays charged positively. The more electrons go off the more the source becomes positive.

There is a dual effect of the positive charge: It acts as a brake on the fast electrons and eventually slows them down, and, at the same time, it speeds up any positively charged ions floating in inter-galactic space. These ions may be protons (the ions of hydrogen atoms) or ions of even heavier elements. Positive electrons, too, would be accelerated.

Thus, as the race goes on, the massive ions (the slow tortoises) start to speed up and the swift hares (the electrons) start to slow down.

At some point, far out from the source of the cosmic rays, the speeds of the electrons and the speeds of heavier ions will be equal. At this point, however, the energy possessed by the heavy ions will be nearly two thousand times as great as the energies of the electrons.

Cosmic ray studies near the top of the atmosphere with radio sounding balloons disclose that the soft component of cosmic rays—which never are detectable on earth—are formed by charged particles about equal in number. These, it is pictured, are the "weakened" electrons and positrons striking the atmosphere.

The hard component of cosmic rays, however, apparently is formed by highly energetic positively charged particles. It is the hydrogen ions—or even more massive charged atoms—which Dr. Johnson believes causes the hard component of cosmic rays found on earth.

These "hard" rays are now known to be the mesotrons, particles having a mass intermediate between protons and electrons. That mesotrons are formed in the top of the atmosphere by impacts with primary rays from the outside is known, Dr. Johnson said, because the mesotrons are particles whose half life is only about one two-millionth of a second.

Traveling at nearly the speed of light, they have time to get down through the earth's atmosphere but their short life makes it virtually impossible for them to originate at any distance outside the earth's belt of air.

Science News Letter, June 3, 1939

AERONAUTICS

"Alphabet-Number Soup" For Army and Navy Planes

"OH, THAT BT-9's a mean one. It'll turn around and bite its tail in a minute."

"It's easier than messing around with a P-36, I say. But I like a real comfortable job, a B-17, f'instance, or even a C-39. Best of all is the Navy's PBY."

Newspaper readers will be seeing this "alphabet-number soup" more and more frequently during the next few months as the New Deal's air armament program gets under way, and hear it more often, too, as young men become involved in a program to make a nation air-conscious.

It's the airplane naming system of the Army and Navy in action, a form of government abbreviation that was here long before the New Deal began making initials popular.

Letters refer to a warplane's type and numerals to a particular model, the U. S. Army Air Corps explains. The Navy system is generally similar. The higher a number, in general, the more up-to-date the model is, although every now and then one comes along just to cross up the innocent layman. They've even got letters to show whether a plane is experimental, on service test, has finally won a place as a full-fledged weapon, or even whether it is modified from a standard type.

All bombers are designated "B." The "flying fortress," pride of the Air Corps, is the B-17. But when the Boeing Aircraft Company fitted it with special superchargers to permit high altitude operation, it became the YB-17A. The "Y" tells the cognoscenti it is on service test, the A that it is slightly different from the standard "flying fortress."

The B-15 is the "super flying fortress," half again as large as the Army's most famous airplane. Standard Air Corps equipment is the B-18, twin-engined bomber by Douglas.

Pursuit ship designations begin with "P." The P-26, a Boeing product, is now on its way out of service. It is being replaced with P-35s, built by Seversky; P-36s, Curtiss jobs with radial engines; and P-37s, similar to the P-36s, except for in-line engines. Deep and dark secrets are two later pursuit ships bearing the experimental designation "X"—the XP-38, a twin-engined fighter which streaked across the United States a few weeks ago at 400 miles an hour, and the XP-40, a single-engined affair. The BT-9 is a basic trainer for embryo pilots, as is the "BC-1," the basic combat ship.

Attack planes are the "A" class. Standard type now is the Northrop A-17; a modified version has been ordered and will probably be known as the YA-17A until it has been proved, after which it will become the A-17A. The YA-18 is a new twin-engined type by Curtiss. The observation plane in widest use is the O-47. Cargo planes, for ferrying personnel and supplies from one Army field to another, are principally the C-33, really a Douglas DC-2 14-passenger airliner without the upholstery; and the C-39, a DC-3. An experimental stratosphere plane is the XC-35. The "X" shows the Army isn't through fiddling with it yet.

Science News Letter, June 3, 1939

The bulk of the wildlife population in the United States is on farms, says an officer of the American Forestry Association.

PHYSICS

Atomic Energy Produces Chemical Reaction By Heat

Reported for the First Time When New York University Scientists Produce Explosion Near Atomic Bombardment

THE HEAT produced by the release of atomic energy from the splitting of uranium has been made to create a chemical reaction for the first time, it is reported. (*Physical Review*, May 15)

Scientists of Washington Square College, New York University, have demonstrated that nitrogen iodide can be made to explode when placed near uranium being split by bombardment with neutrons.

The chemical action thus set off is believed caused by the heat released from the splitting uranium atoms. Chemically the reaction is without practical or commercial importance because nitrogen iodide is known to be a very unstable compound which will explode if dropped or otherwise carelessly handled. However, the experiment is perhaps a historic one in this field of research.

Dr. Eugene Feenburg, theoretical physicist, devised the experiment which was carried out by Prof. Walter A. Schneider and R. C. Waddel of N. Y. U. and Dr. Dixon Callihan of the College of the City of New York.

In other studies made on the fascinating problem of the nature of energy released from uranium, scientists of Columbia University reported:

1. The fission products of uranium splitting fly off sufficiently to pierce 2.2 centimeters of air, nearly an inch. Another group, having a range of 1.5 centimeters, was also noted.

2. Two gaseous products (yet unidentified but perhaps inert gases like krypton and xenon) are given off when uranium is split. Both these gases seem to be radioactive with a half-life decay of 35 seconds and five minutes respectively. The short-lived gas is apparently created when barium is produced as the other splitter particle. The chemical element associated with the longer-lived gas seems to be rubidium.

3. The sum of the energies of the two splitter particles comes to a total of 175,000,000 electron volts. This is considerably less than the 200,000,000 electron volt energies predicted for the fission process by theory. The difference is probably due to considerable energy being used for the excitation of the splitter fragments which results in the emission of neutrons, gamma radiation and electrons.

The Columbia researches were carried out by Drs. E. T. Booth, J. R. Dunning, G. N. Glasoe, F. G. Slack and J. Steigman.

Science News Letter, June 3, 1939

ARCHAEOLOGY

Ancient Health Resort Gave Modern Treatment

GERMAN archaeologists have finished digging at the famous health resort of Pergamon in Asia Minor. The ancient spa in its day had such a reputation that its clients included emperors of Rome. If its ruins are still hiding any secrets of Greek health lore, they will remain undetected for the time being.

The Germans have been interested in Pergamon since 1873, when a German civil engineer found a piece of sculptured frieze during some road digging. That find led to excavation of the magnificent altar of Zeus, a six years' task. In 20 years more, the altar was reconstructed in all its grandeur in its own museum in Berlin. It is known as the largest monument of Greek sculpture in existence.

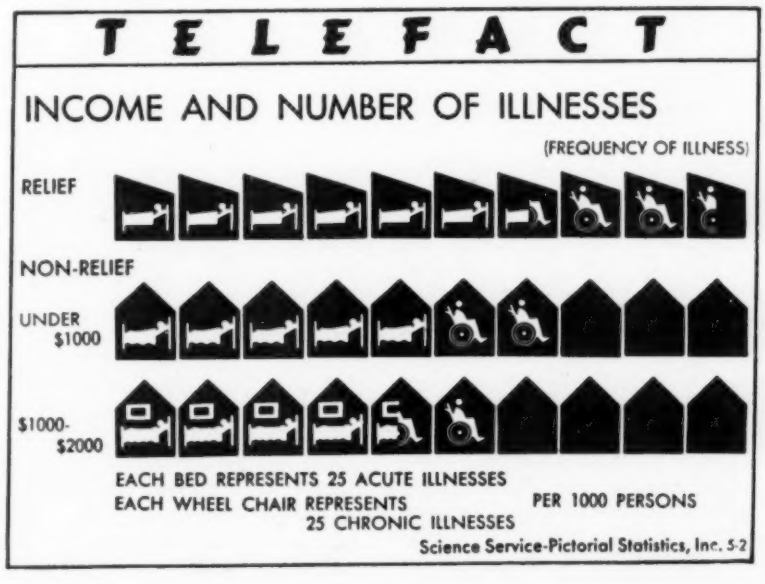
Pergamon's shrine to Aesculapius was an entire sanatorium lay-out of buildings, outside the city. Here, the archaeologists have most recently explored the basement of the healing temple—the sanatorium proper. In the sacred precinct, the patients dreamed, hoping to be visited in sleep by the healing touch of the divinity.

The sacred fountain of the shrine has been located. It is near the center of the campus. The fountain came to light when the explorers traced a tunnel which led out from the basement of the healing temple. They found that this was a subway route for patients to the spring.

At this health resort, as at other Aesculapian centers, the world's early health seekers blended faith treatment with the most matter of fact physical therapy. They took sun baths, mud baths, drank the waters, exercised as directed, and diverted their minds with music and with plays in the theater.

There were about 200 temples of Aesculapius, and three of them were elaborated into sanatoria famed through the Mediterranean world. All three have been investigated archaeologically: Pergamon by Germans; Epidaurus by Greeks; the shrine on the Island of Cos by Italians.

Science News Letter, June 3, 1939



PHYSICS

Study Flashes of Light From Adhesive Tape Roll

HERE'S one you can try for yourself: Take a reel of sticky tape (surgeons' adhesive, electricians', or "Scotch") into a completely dark room. Wait until your eyes are "used to the dark"—dark adapted, as physiologists term it. Then quickly strip off a length of the tape. There's a very good chance you will see a flash of greenish light where it is being pulled from the roll.

As a variant, you might pour a film of collodion on a sheet of glass, and after it has hardened suddenly peel it off in the dark.

This curious flashing, which bears the scientific name of triboluminescence, has been investigated by Prof. E. Newton Harvey and Charles Butt at Princeton University, and is the subject of a report by Prof. Harvey (*Science*)

"It is apparent," states Prof. Harvey, "that these phenomena have a decidedly electrical flavor."

The phenomenon, which other observers have noted also, seems to be related to what happens in a neon tube. The electrical discharge excites the gas molecules and causes them to glow. Indeed, Prof. Harvey and Mr. Butt have obtained the characteristic reddish glow of neon by shaking substances known to be triboluminescent with a steel ball in a tube containing low-pressure atmosphere of neon instead of ordinary air.

Science News Letter, June 3, 1939

PUBLIC HEALTH

Millions Ill Fed Yet Plentiful Food Possible

IN A world that is spending so much on armament for potential warfare, the problem of feeding its populations might seem to be a minor one. This is particularly so because there is so much reference to food surpluses.

Even in this country where agricultural over-production is particularly troublesome, there is that famous one-third of a nation ill fed.

Science is just beginning to make evident the great and serious damage from malnutrition, not the plain, stark hunger of starvation, but the hidden hunger of the partially fed and the semi-starved. Deficiency diseases, such as pellagra and beriberi, have been known for many years to cause heavy mortality throughout the world. The irony of this is that diseases due to faulty nutrition are considered the easiest of all to prevent.

Much more is known about the hidden hunger of the world through studies and surveys drawn together by a nutrition committee of the League of Nations. Even if the League can not settle the political problems of the world, it is trying to stimulate adequate use of our food resources to prevent damage being done to the human race by malnutrition.

Facts unearthed, in the opinion of Sir John Boyd Orr, Britain's leader in applying nutrition's newer knowledge, are "sufficiently startling to warrant immediate changes in national food policies."

In Australia 17.9% of some 3,000 children of inland areas and 21.7% of pre-school children in Melbourne showed malnutrition, due largely to lack of dairy products, fruit and vegetables. Yet the Australian government has been searching for an export market for just such products.

If Hungary's nutrition needs were fully met and exports maintained, milk production should be increased 120% and eggs by 470%. The Jugoslavian peasant's diet in winter consists almost solely of bread and beans.

In the United States, a U. S. Department of Agriculture survey showed that half the families of wage earners and low-salaried clerks are not getting adequate nourishment.

Science News Letter, June 3, 1939

AERONAUTICS

Device for Training Planes Simulates Radio Range

A PORTABLE device for use in training planes—which will crowd the sky next year as the government program for training 15,000 pilots yearly gets under way and spurs other thousands into aviation—has been invented by Herbert M. Peters, veteran airman and manager of the Ithaca airport.

Because the nearest radio range station is 20 air miles away and because present ground training devices for teaching blind flying are extremely expensive, Mr. Peters, aided by several Cornell University students, built a substitute device which fits into the training plane.

A radio-tube arrangement simulates the signals heard over an actual range, and permits the instructor to vary signals at will to impose problems for the student to solve as well as obtain practice in following the signal. Mr. Peters' invention weighs 18 pounds.

Science News Letter, June 3, 1939

IN SCIENCE

PSYCHOLOGY

Understanding of Old Age Needed, Not Pity

SOME people look on old age with horror, some with veneration and a good many with sentimental pity. Understanding, based on facts, however, is what is really needed, according to Dr. George Lawton, psychological adviser to the Andrew Freedman Home in New York City.

"It is easy enough to grow maudlin over old people and to feel sorry for them and for ourselves who must grow old," Dr. Lawton pointed out.

"It is even easier for us to force premature dependence on men and women, and then, when they are helpless, take care of them in a fit of zealous good-Samaritanism. I think," Dr. Lawton declared, "that the greatest service we can render old age and ourselves is to study it with scientific detachment and then enforce whatever recommendations are called for by such study."

Dr. Lawton outlined a six-point program for attacking the problem of aging in its mental health aspects.

First, he calls for intensive, systematic, long-time studies of the mental abilities, interests, recreational activities, personalities and emotional problems of large groups of men and women in each decade of life from 40 to 80 years.

Second, after all the facts about old age are at hand, and not before, he advises setting up old age guidance clinics similar to the present child guidance clinics.

Third, after the first two steps have been taken, individual psychologists and psychiatrists will begin to include old people in their practice and from this will come knowledge on how to treat the aged.

Fourth, Dr. Lawton wants courses in geriatrics given in medical schools.

Fifth on his program comes social planning and change necessary to effect lasting reduction in the maladjustments of old people.

Sixth, schools and colleges should prepare young people and adults for the problems they will have to face as they grow older.

Science News Letter, June 3, 1939

NCE FIELDS

PUBLIC HEALTH

Search For Possible Poison Effects of Fluorine

SCIENTISTS of half a dozen University of Chicago departments have launched a cooperative search for possible harmful poisonous effects of fluorine on the human body as a result of growing proof that its occurrence in food, air and water in many parts of the earth is responsible for mottled teeth.

"Black tooth," known in 31 states and in many foreign countries, affects about 5,000,000 people in the United States alone, a National Academy of Sciences committee, headed by Prof. Anton J. Carlson of the University, has already shown.

Large doses of fluorine, which occurs in many commonly used industrial materials and processes, is known to cause changes in the body, or even death.

Science News Letter, June 3, 1939

MEDICINE

Rubbing Tongue With Ice Kills Bitter Taste

IF YOU have bitter medicine to take, rub your tongue with ice and you won't know you aren't dining on milk and honey.

This useful advice is based on observations of Dr. Harald Tangl of the University of Budapest, whose recent lecture on the sense of taste is reported in the *Journal of the American Medical Association* (April 22).

However much sugar is put in ice cream it won't taste too sweet because when they are cooled the taste buds on the tongue scarcely function. For this reason warm coffee requires less sugar to sweeten it than iced coffee. Warmth is a stimulant to the taste buds.

These taste buds are unevenly divided in the world of nature. An antelope has 50,000; a man has 3,000; a cow has 15,000. The whale has only a few; he gulps his food so quickly that taste is no object. Among horned cattle, taste is important, and they scrupulously select the grasses they like.

While man tastes only with his tongue, fishes taste with their whole body, according to Dr. Tangl.

A baby tastes with the middle part of his tongue and an adult determines with the sides of his tongue whether food is pleasing or not.

There are four distinct tastes: sweet, salty, bitter and sour. The sweet taste is perceived on the tongue most quickly, because the buds reacting on sweets are located at the tip of the tongue. Next comes salt and then comes sour. Bitter things are tasted at the back of the tongue.

The taste can be trained. Tea tasters can tell the place of origin of a tea after a single tasting. Wine tasters can tell where the grapes were grown and whether they grew in a shady or in a sunny field.

Science News Letter, June 3, 1939

MEDICINE

X-Ray Technique Can Save Mothers' And Babies' Lives

LIVES of mothers and babies can be saved by a method of X-ray diagnosis shown in the exhibit by Drs. A. Louis Dipple and Webster H. Brown, of the Johns Hopkins Hospital, Baltimore, which won for them an American Medical Association certificate of merit.

By a special method of taking the X-ray picture of the mother during the last three months before the child is born, the Hopkins doctors can tell whether she is likely to develop the dreaded condition of placenta praevia, in which the "afterbirth" or placenta comes before the baby instead of after. This is one of the most serious complications of pregnancy, Dr. Dippel explained, since there are no premonitory symptoms. The mother suddenly starts bleeding and the hemorrhage is so rapid and severe that there is rarely time to stop it before the mother dies. The condition occurs in about one out of every 250 childbirths. In hospitals under ideal conditions, only about eight out of every hundred of these patients die, but when the hemorrhage starts when the expectant mother is still in her home, as is often the case, half or more of the mothers are lost and nearly half of the babies.

This mortality could be cut to a very low figure, Dr. Dippel believes, if every mother had an X-ray made during the last three months before the child's birth is expected. When the X-ray shows that this condition is present, the doctor can perform a Caesarean operation to deliver the baby before the dangerous hemorrhage starts.

Science News Letter, June 3, 1939

PHYSICS

Store Sun-Energy in Silos, Is Proposal of Scientist

STORE the now-wasted surplus sun-energy in underground silos as trapped heat, to be drawn out and used as needed, is the proposal of Dr. F. G. Cottrell, well-known Washington scientist. Dr. Cottrell's suggestion is incorporated in a new report by Dr. Charles G. Abbot, secretary of the Smithsonian Institution, in which latest developments of Dr. Abbot's many years of research on direct utilization of sunpower are discussed.

The "solar-silo" scheme is exceedingly simple. There would be a deep, cylindrical, concrete-lined pit, filled nearly to the top with loose, dry sand, and "stoppered" with about ten feet of glass wool, an excellent heat insulator. To the top of the sand would run a branched inlet pipe, from a solar heater, of the focussing mirror type invented by Dr. Abbot. An automatically controlled pump would bring in heated air when the sun was shining, and stop at night or in cloudy weather. A second set of pipes, at the bottom, would draw off the heated air as needed. It is believed that the sand, under its thick blanket of glass wool, would retain its high initial temperature for perhaps many months.

Dr. Abbot's latest improvement in the solar heater itself has been an automatic control of the water-stream flowing through it, to be converted into steam by the mirror-focussed rays of the sun. It is now arranged to take in water more rapidly as the boiler becomes hotter, and to cut it off when lack of sunlight reduces available heat.

Science News Letter, June 3, 1939

GENERAL SCIENCE

Assets Of Foundations Total $1,200,000,000

CAPITAL assets of American foundations now total more than $1,200,000,000, a survey prepared by the Raymond Rich Associates as a continuation of previous Twentieth Century Fund studies revealed.

Reports from 243 leading foundations are embraced in the study. One hundred and twenty-one of the 243 reported capital assets amounting to $945,443,637 at the end of 1937, last year for which complete figures are available. Available information on the other 122 indicates that their total assets amount to another $250,000,000.

Science News Letter, June 3, 1939

ARCHAEOLOGY

The Bride Wore White

But Ancient Styles Studied by Archaeologists Show Men Had Worse Clothes Problem Than Women

By EMILY C. DAVIS

THE FLURRIED June bride needn't sigh to be back in some less hectic age—getting married, for example, to an "old Roman." That is to say, of course, getting married to a young Roman in ancient Rome.

It wouldn't do her any good. Weddings 2,000 years ago were just as dizzy, just as full of white dresses and bridal veils and superstitions and headaches and the rest of it, as they are in the spring of '39.

Take a few Roman facts:

The wedding day had to be picked, oh, so carefully! Some days were unlucky. The whole first part of June was out. There were religious festivals then. May was out, for the same reason. In fact, a third of the days in the year were wrong.

Then, the things to be done, and checked off the list!

Wedding cake for guests to take home, not to mention feeding the guests at the usual reception.

The bride mustn't forget to gather flowers for her own wreath. The groom would get his own, if he decided to wear one.

Somebody must see that the groom had nuts to carry. Yes, nuts. The groom always scattered nuts when he and his blushing bride paraded to their new home after the festivities were over. Nowadays, the wedding guests do the throwing, arming themselves with confetti or rice.

Three Coins

The bride must have three coins in her hand, when she started for the new home. Not for emergency transportation. The Romans wouldn't have understood about "mad money." No; the three coins had to be distributed, one to the gods of the crossroad, one to the groom—to reassure him she was bringing a dowry—and one to the household gods in her new residence.

You get the idea, perhaps, that with minor differences the wedding atmosphere was about as usual.

And coming to the absorbing topic of what the bride wore—

But for that, and the latest news on Roman fashions, we can turn to a new publication on "The Clothing of the Ancient Romans," by Dr. Lillian M. Wilson, published by the Johns Hopkins Press.

Dr. Wilson, an archaeologist with a bit of the home economics expert in her system, has carefully studied what the Romans wore.

She has inspected tons of statuary and yards of wall paintings. She has read what ancient writers had to say about fashions. They didn't call fashion spinach, but some of them said plenty, with the same satiric expression.

Dr. Wilson has cut patterns of Roman togas, tunics, and cloaks. She has corraled young students and posed them in garments cut and draped just as the Romans used to wear them.

From all this historic dressmaking, you can now have a better idea of what clothes problems were like 2,000 years ago in fashionable Rome. Men had the worst of it, as you will see presently. A toga was something even a noble Roman couldn't enjoy wearing.

Soft White Wool

But the bride! The Roman bride wore white, Dr. Wilson explains. Her dress was simple, just a long tunic made of soft white wool, and the dressmaking was no great job. The important thing was to have the wedding dress "woven upwards by those standing." In other words, on an old fashioned loom. That was for luck.

But don't think for a minute that a Roman girl could throw her simple tunic over her head, letting the folds fall where they would. Far from it. Dr. Wilson stresses the fact that Roman and Greek clothing required care in arrangement. A man worried over the drape of his toga the way a modern male frowns over his tie. A woman would be no less particular.

The bride gathered in her tunic at the waist with a girdle and a Herculean knot, which doesn't mean that the knot was tied in any strong-man fashion. Rather, the knot was probably a symbol of Hercules, patron god of marriage. And it was one of the groom's first duties as a married man to untie the bride's girdle for her.

So—the wedding dress was conventional white, artistically arranged. But the veil was yellow. So were the shoes. This yellow, Dr. Wilson explains, was actually a bright orange or flame tint. A glimpse of the color still remains on one fresco painting, showing a Roman bridal party. The veil can be distinctly seen as a saffron yellow.

Because Roman brides always wore veils when their pictures were taken in sculptured portraits, the way they wore their hair is a mystery. All we know is that the hair was plaited in six braids and bound round the head.

Parted by Sword

We are told, however, that in arranging the bride's hair it was supposed to be parted with a sword. Why a sword, on a jittery occasion like a wedding day, is hard to imagine. Especially when you think that combs were a very old invention. One authority on the private life of the Romans hazards a guess that the sword used in fixing the bride's hair must have been a spear or spear-shaped comb that symbolized the ancient practice of capturing a bride.

The groom wore a toga. He had no alternative. The toga was the dress suit of a Roman citizen; also his frock coat. His toga was also his dinner suit, until the first century A.D. when some advanced thinkers introduced to fashionable men-about-Rome an outfit for dining called a synthesis.

What a synthesis was in fashion history is not too well understood. But from descriptions, it was a colorful and rich costume. Roman wit Martial had a fling at a friend who rose—so Martial declared—eleven times during one dinner to put on a fresh synthesis. Showing off his wardrobe, said Martial derisively.

The toga was stately and beautiful, Dr. Wilson says, but it was about as inconvenient a costume as could have been devised. Romans apparently learned to keep on most kinds of togas—there were a number of types—without pins. However, Dr. Wilson doesn't advise actors or others who dress up as noble Romans to try wearing a pin-less toga.

But, although Romans did master the draping and holding of a toga, they avoided wearing one whenever they

could. A citizen was expected to wear his toga when he went to public affairs or anywhere else that called for him to look dignified and patriotic. But Romans evaded toga-wearing the way modern men find excuses for not donning evening clothes. Emperors had to prod Romans into wearing togas. They would fall into the comfortable habit of dressing informally, in the tunic that was put on over the head and stayed "put." Wearing a tunic without the toga over it, was about like wearing shirt sleeves today. The writer Juvenal sighed for country life, where only the dead wore togas.

For 800 Years

Romans put up with togas for 800 years, which is something of a record. Dr. Wilson explains that originally a toga must have been nothing more than a blanket. But then, it acquired a curved edge or other geometric outlines, and had to be draped certain ways for style. If you were a Roman senator you had a broad stripe of purple on your toga. Mostly, togas were white, and presumably they were generally wool.

Just to get an idea of what a Roman man went through with, in dressing of a morning, here is a formula for getting into a simpler, and older, type of toga:

You throw the long piece of material backward over your left shoulder, so that one end remains hanging down in front to the shin or lower. The long portion thrown over the left shoulder is now drawn around your back and under the right arm and again thrown over the left shoulder. The end trails down the back. This leaves your right arm free for gestures, while the left clutches the folds. The imperial toga was put on in similar routine, except that it was more voluminous and complicated.

"No toga or other drapery was ever arranged twice in precisely the same lines," Dr. Wilson has concluded from observing statues and paintings. Hence, no exact instructions can be given for getting just the right effect. Practice does it.

The toga is one clothes problem that women escaped. At least, the respectable Roman matron did not wear one, Dr. Wilson is convinced. Her ancestors in remote antiquity wore togas—men and women alike. But that was when togas were not much more than blankets. One type of Roman woman alone wore a toga, and that was the courtesan, who wore it as a badge of her profession.

Whether little daughters of Roman citizens wore the distinctly Roman garment, the toga, is something not yet settled. There are few portrayals of young girls in Roman art. But Dr. Wilson's view is that a toga would have been old-fashioned for girls in the Roman Empire. They may have revived the fashion in the Age of Augustus. He was, she explains, "something of a faddist in the matter of ancient dress."

But usually, girls, like the women, wore a tunic.

"The modern one-piece dress with kimono sleeves is its direct descendant," Dr. Wilson points out.

Girls also, however, wore a tunic with an upper portion falling to the knees. It is a style effect still revived now and then, and still called a peplum.

Barring details, small boys wore usually a tunic as their outer costume. They were small editions of their fathers in these tunics, sometimes topped by a schoolboy's type of toga.

No Record of Undies

Lacking the candid camera touch in their sculptures and paintings, the Romans neglected to leave the world a good idea of their more intimate garments. Dr. Wilson gains random bits of information from ancient writings. The great Augustus, for example, is reported to have worn four tunics, a toga, and a subcula in cold weather. The subcula was a short shirt, which we might class with "heavies."

Romans had a variety of cloaks to top their costumes for cold or rainy weather. As many as eight or nine kinds can be counted in literary sources, if you care to try that kind of antiquarian arithmetic. Romans, you will find, had the equivalents of rain coats, overcoats, military cloaks. They had long and short cloaks, with and without hoods.

Early Christians adopted a Roman cloak called a pallium, which you can see wrapped around saints and converts in many a relic of early Christian art. A long tunic was worn usually beneath this oblong mantle.

Imported Styles

With Romans, the pallium was a topic of controversy. They had borrowed the style from Greeks. In fact, a pallium was nothing more than the classic drapery worn by Greek gods in their sculptured appearances, and by Greek mortals in everyday life. Romans saw no objection to including a pallium in a man's outfit, but when some citizens dared to say it was a substitute for a toga, and more comfortable—that was cause for criticism.

A modern bride can get some comfort from ancient Rome, after all. She can find good arguments there for any

MODERNS IN ANCIENT DRESS

The Roman bride wore white, with a golden yellow veil. Her shoes were yellow. Her hair was arranged in six braids bound around her head. Roman weddings were just as full of traditions and proprieties as ours are. At right, two American boys drape an imperial toga, according to Dr. Wilson's directions. Less voluminous togas were worn sometimes. But here you see the toga worn during the Empire, by senators and high officials as the national dress suit. The boy assisting is wearing a tunic, equivalent of modern shirt sleeves.

male criticisms on women's clothes. In Roman days, it was the men who put up with very inconvenient and hampering styles, and they went on wearing those togas for 800 years!

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Science News Letter, June 3, 1939

PUBLIC HEALTH

Infantile Paralysis In South Carolina

THE INFANTILE paralysis outbreak in South Carolina continues unabated while the rest of the nation is remarkably free from the dreaded childhood plague, latest reports to the U. S. Public Health Service indicate. The federal health service has had three officers investigating the outbreak and expects to send experts on infantile paralysis after-care to South Carolina as soon as possible.

During the week ended May 20 there were 28 cases of the ailment in South Carolina, most of them in and around Charleston. In the rest of the nation there were 15 cases scattered throughout nine states. The South Carolina outbreak has been building up since before Christmas, with a sudden increase during the first week in May. Normally health officials would expect about 19 cases of the disease in the entire country at this time of year.

No major outbreak of infantile paralysis has occurred since the summer of 1937. Health officials are unable to predict whether the South Carolina epidemic will remain local or will spread throughout the rest of the country this summer.

Science News Letter, June 3, 1939

Food products on the market are put up in 257 sizes of cans, but the U. S. Department of Agriculture has recommended reducing to 14 sizes.

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ARCHAEOLOGY

Greek Actor Could Escape Through Space of Single Tile

WHEN Greek playwright Aristophanes had a comic actor in his play "Wasps" try to climb through a roof where a single tile was out, he was not asking the impossible, Dr. David M. Robinson, Johns Hopkins University archaeologist, has discovered.

Excavating the Greek city of Olynthos, he has found flat-pan roof tiles as big as 22 by 18 inches. Experimenting for himself, he reports that a thin man could "make it" escaping through the gap of one tile, allowing for the setting of the tile in roof construction.

Another puzzle in stage directions of ancient classic drama is also cleared up by finding that in one Olynthos mansion a character could hide in a storeroom, unnoticed by a woman coming downstairs into the front of the room, as required in a comedy plot by Menander. The storeroom in this house is below the level of the entrance.

The ten-room house shedding light on Greek stage settings is named the "Villa of Many Colors" by its discoverers, because the walls were gay with blue, white, yellow, red, and burnt orange surface and molded stucco designs.

The home of a Greek fighter and wild game hunter is another discovery of the latest expedition to Olynthos, which Dr. Robinson directed in association with Dr. George E. Mylonas of the Washington University of St. Louis. The excavations were under auspices of the American School of Classical Studies in Athens. The hunter's nine-room house contained an arsenal of big knives, a sword blade, shield, twelve slingstones of lead, and spear and arrow heads. Bones of wild animals were in the house when it was burned in the wild conflagration that swept the city when Philip of Macedon destroyed Olynthos in 348 B. C.

Olynthians were a hybrid group. This is the verdict of the expedition anthropologist, John L. Angel. The men were fairly tall, women almost short. Burials excavated show that the "average Olynthian probably had a medium head, not very high, with a low wide face and wide unimpressive nose and a strong jaw." Mr. Angel adds that this average man's teeth were good and he lived to no great age.

The complete skeleton of a small ancient horse like those immortalized in the Parthenon frieze at Athens is another discovery from the Olynthos cemetery.

Science News Letter, June 3, 1939

PHYSICS

Super Cyclotron Planned As Largest Is Finished

WHILE final touches are being applied to the most powerful atom smasher in the world at the University of California, Prof. E. O. Lawrence, inventor of the cyclotron, is already at work planning for a super machine that will create atomic particles having energies of 100,000,000 electron volts.

The new giant cyclotron weighs 225 tons and will create 21,000,000 electron volt particles. The one in Prof. Lawrence's mind would weigh about 2,000 tons. In size this cyclotron would be 35 feet long, 25 feet high and 15 feet wide. While designed for 100,000,000 electron volt alpha particles (nuclei of helium atoms) it is conceivable that considerably higher energy particles could be obtained from it.

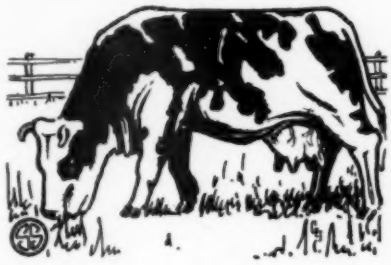
The record size of the 225-ton Berkeley cyclotron will last only for a short time for it is being duplicated now in Japan and an even larger one, weighing 300 tons, is under construction at Manchester, England.

Science News Letter, June 3, 1939

A committee of women who are teachers or students of Hebrew plan to replace the "random vocabulary" now taught in study of this language with a vocabulary dealing with the daily life and religious interests of Jewish people.

ZOOLOGY

NATURE RAMBLINGS
by Frank Thone



Evolution of Domestication

DOMESTICATION of animals evolved along with agriculture, not ahead of it as is often assumed, declares Dr. E. Werth, of Berlin-Dahlem (*Die Naturwissenschaften,* April 28). He sees the domestication process as having evolved in two major steps, corresponding to the two major advances in agricultural technique.

Most primitive of agricultural techniques is the type that uses the hoe as its principal implement. Hoe-farmers are such peoples as many present-day African tribes, and the corn-raising American Indians. The one great advance in agriculture, that divides it definitely into two parts (even though the invention itself was prehistoric or protohistoric) was the plow.

Dr. Werth agrees with practically all students of early man in the belief that the hunting peoples of the Old Stone Age had no domestic animals. Just as they emerged, in that last paleolithic stage known technically as the Azilian, they picked up the dog, the first of all domesticated animals.

Coming into the first of the neolithic, agricultural stages, man domesticated first the *smaller* animals, like pigs, sheep, goats and poultry. These were easier to capture and pen; they could be (and probably usually were) kept under the same roof with the family for better protection. They were good primarily for food, fiber, milk and eggs, not as work-animals.

After the invention of the plow, the value of muscles other than those of the farmer and his womenfolk recommended itself. And so came about the pursuit, capture and bondage of horse, ox, ass, camel and (in the East) the water-buffalo. This quite literally drew in their train a whole array of new implements that made farming and transport easier—first the plow, then harrow, sledge, cart and wagon, chariot and carriage.

Dr. Werth's arrangement is intriguingly neat—perhaps too neat to be true. Nevertheless it recommends itself as at least a working hypothesis, to be tested for discovery whether it be true or not.

Science News Letter, June 3, 1939

PUBLIC HEALTH

Eminent Disease Fighter Has Undiagnosed Ailment

ONE OF America's Number One disease fighters, Dr. James P. Leake, Medical Director, U. S. Public Health Service, is seriously ill in the U. S. Marine Hospital, Baltimore.

Physicians have not yet been able to make a diagnosis of what ails him, but colleagues in the federal health service are sure that he is not suffering from any of the infectious diseases he has been investigating. Latest reports (May 27) are that he is "doing very nicely."

Dr. Leake is recognized as an authority on infantile paralysis, sleeping sickness or encephalitis, smallpox and other virus-caused ailments, and has for years been in the forefront of the fight against epidemics of these diseases. He has only recently returned from South Carolina where he was investigating the infantile paralysis outbreak in that state.

The laboratory work on tetraethyl lead, which led to recognition of its danger when it was introduced in anti-knock gasolines, was done under Dr. Leake's supervision, and he has engaged in many other fights against disease.

Science News Letter, June 3, 1939

PHYSICS

Phenomenon of Aurora Is Duplicated in Laboratory

See Front Cover

BY FIRING a stream of electrons through neon gas and curving their luminous train with a magnet, Dr. M. E. Bell has demonstrated in the Westinghouse Research Laboratories the spectacle Nature provides when the earth deflects streams of electrons from the sun and sends them colliding with molecules of gas in the upper air, making the Aurora Borealis. Visitors at New York's World's Fair will see the artificial Aurora as it is illustrated on the front cover of this week's SCIENCE NEWS LETTER.

Science News Letter, June 3, 1939

Here is a book that will open before you a world of undreamed wonders. Study the ant's astounding organizations and you will marvel at the uncanny parallels between its social systems and those of man . . . at the workings of its democratic, fascist, communistic and slave states. You will meet such intriguing personalities of the ant colony as queens, cows, pets, warriors, policemen, slaves and thieves. You will see ingenious adaptations to environment that rival man's resourcefulness. Your imagination will be gripped by the cleverness with which the ant solves its political, economic and social problems.

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By DR. CARYL P. HASKINS

. . . will tempt you to build your own glass nest (a few minutes' chore), or study the drama of ant life in the nearest field or garden. Having read the book, you will find in actual "field study" your key to the most rewarding, intriguing, educational hobby that ever brightened your leisure moments. You will witness with your own eyes, as you do through the author's, the daily activities, trials, failures and triumphs of the world's most advanced and systematic creature . . . the ant.

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NUTRITION

New Disease Discovered by Government Health Service

Lack of One of New Vitamins, Riboflavin, Causes Ugly Moist Sores and Cracks at Corners of Mouth

DISCOVERY of a new, disfiguring disease which people get from a diet lacking in one of the new vitamins, riboflavin, was announced by Drs. W. H. Sebrell and R. E. Butler, of the U. S. National Institute of Health, Washington, at the meeting of the American Institute of Nutrition.

Ugly moist sores and cracks at the corners of the lips appear in patients suffering from this ailment. Later the skin around the nose and on the ears gets red and slightly greasy and peels. This disfiguring condition, which has been confused with pellagra in the past, is quite prevalent, Dr. Sebrell believes. He first discovered it in the South, but has already had reports of a dozen cases seen in Bellevue Hospital in New York City. A similar condition has been reported from Malaya and India.

The ailment is due to lack of riboflavin, a chemical which has only recently been discovered as an essential of the diet and which belongs in the class of the vitamins. Giving this chemical to the patients cures the condition. Nicotinic acid, cure for pellagra with which the disfiguring condition has been confused, does not cure this new disease, Dr. Sebrell found from study of 18 women suffering from the ugly sores at the corners of their mouths.

The sore mouths are probably only the outward signs of a general change in the body resulting from lack of riboflavin in the diet, Dr. Sebrell explained. The condition is new only in the sense that it has just been recognized as a separate ailment. When more cases have been studied, other and possibly more serious effects of riboflavin lack may be discovered. Dr. Sebrell has christened the new ailment aribоflavinosis. He pronounces that jaw-breaking scientific name with all the vowels long except the last "i" and accents the second and next to last syllables.

Hunt For Unknown Vitamin

A NEW and still undiscovered vitamin, necessary for health and perhaps for utilization of nicotinic acid to prevent pellagra, was hinted at in the report of Drs. C. A. Elvehjem, Harry A. Waisman and A. E. Axelrod of the University of Wisconsin. Dr. Elvehjem's discovery of the importance of nicotinic acid in animal nutrition is what led to its use by physicians to cure pellagra.

Liver extract, for example, does more good to a dog sick with black tongue, canine counterpart of pellagra, than can be accounted for solely by the amount of nicotinic acid in the liver. Search for some other substance in liver, possibly another vitamin, which may account for this effect is now under way.

Various foodstuffs are also being investigated to determine which ones contain most nicotinic acid. Since there are no entirely satisfactory chemical tests yet available, the nicotinic acid content of foods must be determined by "trying them on the dog," that is, seeing which ones are best for curing or preventing black tongue in dogs. Only certain foods, the Wisconsin investigators found, will produce rapid improvement when given in amounts that a sick dog will readily consume. This group of foods includes practically all animal tissues and yeast.

Apple Powder vs. Lead

SOMETHING in apples, probably the pectin, absorbs lead, such as found in lead arsenate spray, and keeps the lead from being retained in the body when eaten with apples or apple powder, it is claimed as a result of experiments announced by J. B. Shields, Prof. H. H. Mitchell and Prof. W. A. Ruth of the University of Illinois.

This will be taken to mean that there is no need to worry over possibility of lead poisoning from eating the residue of lead arsenate spray along with sprayed apples, but the Illinois investigators stated emphatically that no sweeping conclusions should be drawn as their investigations were not made on the poisonous effects of lead but only on its retention as affected by constituents of apples.

The studies were made on rats that were fed diets containing various combinations of apple powder and lead arsenate and also diets containing lead arsenate without apple powder. As more apple powder was added to the diet, the amount of lead retained in the rats' bodies got smaller. The storage of lead was modified 21 per cent by the presence of 15 per cent apple powder in the diet and 55 per cent by the presence of 60 per cent apple powder in the diet.

Science News Letter, June 3, 1939

CHEMISTRY

Continuous Bleaching For Textiles Developed

PEROXIDE is the basic reagent of a new continuous bleaching process announced by the E. I. du Pont de Nemours and Company.

The new process is claimed to be extremely simple. The goods being bleached are saturated in a rope form and pass into a reaction box where the bleaching occurs. Continuously the materials are pulled through washers to the white bins. The method has been successfully applied to cotton piecegoods lighter than sheeting.

Science News Letter, June 3, 1939

Tracks of a big dinosaur that took 12½ foot strides have been found on the Navajo Indian Reservation near the Grand Canyon.

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•First Glances at New Books

Additional Reviews On Page 352

Meteorology

PHYSICAL METEOROLOGY—John G. Albright—*Prentice-Hall,* 302 p., $5.35. The rapid growth of commercial aviation has lent new emphasis to better weather forecasting and an understanding of its basic phenomena. In publishing the material of his course in meteorology at Case School of Applied Science, Prof. Albright has given the reader an excellent starting point for a comprehension of this subject.

Science News Letter, June 3, 1939

Home Economics

INDEX TO THE LITERATURE OF FOOD INVESTIGATION — Agnes Elisabeth Glennie, comp.—*British Library of Information,* 269 p., $1.35.

Science News Letter, June 3, 1939

Chemistry

PHOTOCHEMISTRY AND THE MECHANISM OF CHEMICAL REACTIONS—Gerhard K. Rollefson and Milton Burton—*Prentice-Hall,* 445 p., $5.75. How closely physics and chemistry are now becoming linked is aptly illustrated by this new text explaining the chemical reactions which occur when radiation strikes material matter, either in the gaseous, liquid or solid state. A good book in its field.

Science News Letter, June 3, 1939

Mathematics

NUMBER, THE LANGUAGE OF SCIENCE, 2d ed. — Tobias Dantzig — *Macmillan,* 329 p., $3. Here is a new edition of what has become a most popular book for the intelligent layman. Twenty-six short essays on a variety of topics in mathematics are included as well as some of the material from the earlier edition, in a special appendix. Interesting matters in the history of mathematics and its philosophical implications are included.

Science News Letter, June 3, 1939

Mineralogy

DESCRIPTIVE LIST OF THE NEW MINERALS, 1892-1938 — George Letchworth English, comp.—*McGraw-Hill,* 258 p., $3. A technical book for mineralogists which contains all the new mineral names not mentioned in Dana's System of Mineralogy.

Science News Letter, June 3, 1939

Anthropology

ANTHROPOLOGICAL PAPERS—Bureau of American Ethnology — *Govt. Print. Off.,* 305 p., 32 pl., 60c. Bulletin 123. Six more manuscripts, including a photographic report, in one of the newer series of Smithsonian Institution publications. It includes Dr. Vincenzo Petrullo's study of Yaruro Indians in Venezuela; Dr. Gann's excavation at a Mayan site; and an edited translation by Ronald Ives of Sedelmayr's Relacion of 1746, one of the less familiar valuable accounts of Southwest exploration.

Science News Letter, June 3, 1939

Hygiene

PERSONAL AND COMMUNITY HEALTH, 5th ed.—C. E. Turner—*Mosby,* 652 p., $3. This latest edition of Prof. Turner's well-known and widely used text for college and university students has been revised to include new knowledge of the subject and has been printed on eye-toned paper.

Science News Letter, June 3, 1939

History

AMERICANS — Emil Jordan — *Norton,* 459 p., $3.50. Contains chapters on the racial and civilizing elements that have made America of the past and present. From the Incas, Mound Builders, and other prehistoric cultures, the panorama moves forward to separate chapters on the European, Asiatic, and African factors in the New World of today.

Science News Letter, June 3, 1939

History

LA SALLE: Explorer of Our Midland Empire—Flora Warren Seymour—*Appleton-Century,* 236 p., $2. A real adventure tale for boys, presented in sizeable print and accompanied by a sketch map, to aid in following La Salle's empire-building efforts in the American wilderness.

Science News Letter, June 3, 1939

Language

HANDBOOK OF AMERICAN INDIAN LANGUAGES—Edited by Franz Boas—*Augustin,* 707 p., $5. Five "illustrative sketches" of Tonkawa, Quileute, Yuchi, Zuni, and Coeur d'Alene languages, describing the grammar of each in full detail. Since the same procedure is followed in analyzing each language, the volume offers ready reference in comparing traits of other languages.

Science News Letter, June 3, 1939

History

A SHORT HISTORY OF THE ANCIENT WORLD—Charles E. Smith and Paul G. Moorhead — Appleton-Century, 653 p., $3.75. A basic text for college courses, in which the bulk of the space is devoted to Greeks and Romans and their experiences and problems. The record is carried forward to the collapse of the Roman Empire in the West.

Science News Letter, June 3, 1939

Geography

DEATH VALLEY — Federal Writers' Project—*Houghton-Mifflin,* 75 p., illus., map, $1. Despite its name, there is great beauty in Death Valley, which is brought out in this new book of the American Guide Series by means of many fine pictures, short but informative text sections, and outline itineraries of trips. It is a little startling, among all the illustrations of barren soil and bare rock, to come upon others showing a golf course and a bathing party basking beside the water in the checkered shade of palms.

Science News Letter, June 3, 1939

Geography

A GUIDE IN THE STUDY OF PRINCIPLES OF GEOGRAPHY — Catherine L. Braun—*Prentice-Hall,* 138 p., $1.25. A manual for students to use in connection with various reference texts to which they may have access. It is intended to "provide for a clearer conception of the meaning of geography."

Science News Letter, June 3, 1939

Entomology

THE EMBRYOLOGY OF FLEAS—Edward L. Kessel—*Smithsonian Institution,* 78 p., 12 pl., 45c. This is a brochure of the kind that is always regarded with levity by laymen but with gravity by scientists, for it really is a publication of serious importance both to entomologists and to students of animal phylogenies.

Science News Letter, June 3, 1939

Biology

A LABORATORY INTRODUCTION TO ANIMAL ECOLOGY AND TAXONOMY—Orlando Park, W. C. Allee and V. E. Shelford—*Univ. of Chicago,* 272 p., $2. This handy book, loose-leafed on flat rings, outlines the kind of course in biology that the average beginning student in college really craves but which he seldom gets.

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Bibliography

PERIODICALS FOR SMALL AND MEDIUM-SIZED LIBRARIES, 7th ed. — Frank K. Walter—*Amer. Lib. Assoc.,* 93 p., 75c. A completely rewritten edition of "Periodicals for the Small Library", last issued in 1932. There is an annotated list of 214 titles (including the Science News Letter), classified lists and discussions of special groups, and a great deal of valuable general information about ordering, handling and binding periodicals.

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•First Glances at New Books

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Geography

NATIONAL PARKS OF THE NORTHWEST—Martelle Trager—*Dodd, Mead,* 216 p., illus., $2.50. A trip through the National Parks of the Northwest, beginning with Yellowstone, going out to Olympic by way of Glacier, and starting eastward again through Rocky Mountain. The story is told in a chatty, easy narrative style as the summer vacation-on-wheels of a typical American family, seen through the eyes of the mother and therefore naturally including much of what the children saw and said and did. Mrs. Trager is the wife of the Chief Naturalist of the U. S. National Park Service, so has had ample opportunity to amass facts and develop enthusiasms.

Science News Letter, June 3, 1939

Psychology

LIFE WITHOUT FEAR—Peter Fletcher—*Dutton,* 111 p., $1. The author believes that fear is a religious problem.

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Engineering

STEAM CONQUERS THE ATLANTIC—David Budlong Tyler—*Appleton-Century,* 425 p., $5. An authoritative, well-documented and readable history of the rise of the steamboat as a transport across oceans.

Science News Letter, June 3, 1939

Zoology

THE RECENT MAMMALS OF IDAHO—William B. Davis—*Caxton,* 400 p., $5. An exceedingly useful manual, covering the fauna of a region hitherto not adequately treated. The distribution maps constitute an especially valuable feature.

Science News Letter, June 3, 1939

Genetics

THE EVOLUTION OF GENETIC SYSTEMS—C. D. Darlington—*Cambridge (Macmillan),* 149 p., $2.75. Research workers and advanced students in genetics should find this a highly useful book for it is a compact summary of present knowledge of the mechanics of chromosome and genic behavior.

Science News Letter, June 3, 1939

Safety

SPORTSMANLIKE DRIVING—*American Automobile Assoc.,* 106 p., $2.50. In correlating its activities into the general movement to reduce traffic fatalities the AAA has prepared what is essentially a textbook for high school students on how to drive and what to know about driving. As younger potential drivers study the facts in this valuable book, one can be sure that the death toll on the highways will continue to decline. It should be required reading for adult drivers also.

Science News Letter, June 3, 1939

Engineering

GUIDEPOSTS OF THE SEA—Irving Conklin—*Macmillan,* 94 p., $2. A photographic summary, with considerable text, of the story of the U. S. Lighthouse Service and of the many aids to sea navigation in its charges: lighthouses, lightships, unattended lights, buoys and other aids, as well as a description of the light keeper's life.

Science News Letter, June 3, 1939

Mineralogy

AMERICAN GEM CABOCHONS—William C. McKinley—*Lightner,* 77 p., illus. $1.65. Colored plates of American semi-precious stones, cut and polished without facets, with brief descriptions. An especially valuable feature is a summary tabulation of color, hardness and other properties, which is also an index to the plates.

Science News Letter, June 3, 1939

Geology

ASH FORMATIONS OF THE ISLAND HAWAII—Chester K. Wentworth—*Hawaiian Volcano Research Assn.,* 183 p., plates, $3. (Third Special Report of the Hawaiian Volcano Observatory). A monograph of one phase of the formation of one of the most important volcanic islands in the world. This work will be welcomed by volcanologists and by geologists generally.

Science News Letter, June 3, 1939

Zoology

A FAMILY TO RAISE—Irmengarde Eberle—*Holiday House,* 93 p., $2. Nice pictures; but the author sticks to the outmoded trick of having her birds and beasts talk English.

Science News Letter, June 3, 1939

Economics—Chemistry

THE ECONOMICS OF CHEMICAL INDUSTRIES—Edward H. Hempel—*Wiley,* 259 p., $3. No book, of course, can keep up with the current progress of the economics common to American chemical industries. However, no trade magazine—which may give the current advances—can hope to assemble in one place the background of factual material which makes the study of the current situation possible. Columbia University's Dr. Hempel assembled this valuable material in the present book.

Science News Letter, June 3, 1939

Biography

ALBERT EINSTEIN, MAKER OF UNIVERSES—Haig Gordon Garbedian—*Funk & Wagnalls,* 338 p., $3.75. Biographies of Einstein have been many, but few of them contain such a wealth of anecdotal material.

Science News Letter, June 3, 1939

Physics

PHYSICAL SCIENCE IN MODERN LIFE—E. G. Richardson—*Van Nostrand,* 256 p., $3. In refreshing contrast to the flood of popular books on physics which smash and resmash atoms through countless pages of atomic structure, artificial radioactivity and transmutation, comes this book from England which concerns itself with physics as it relates to things nearer human experience. If you wonder how an airplane can fly, what constitutes quicksand, what limits the clarity of a television screen, then you will find your answer here along with hundreds of other facts outside the domain of nuclear physics.

Science News Letter, June 3, 1939

Mathematics

THE CONCEPTS OF THE CALCULUS—Carl B. Boyer—*Columbia Univ. Press,* 346 p., $3.75. Here is a history of calculus which shows the origins of this most powerful branch of mathematics with emphasis on the development of the basic concepts from antiquity until the time when they became incorporated into the precise form of modern methods.

Science News Letter, June 3, 1939

Botany

FLORA OF RIVERSIDE AND VICINITY—Rosamond A. Fawcett—*The Junior College, Riverside, Calif.,* 172 p., 50c. The flowering plants of one California region carefully "keyed out," with several pages of line illustrations to make terms comprehensible to beginners, and a brief glossary.

Science News Letter, June 3, 1939

Chemistry

COLLOIDAL PHENOMENA: An Introduction to the Science of Colloids—Ernst A. Hauser—*McGraw-Hill,* 294 p., $3. Prof. Hauser offers the material of his course in colloid chemistry and physics, as given at Massachusetts Institute of Technology, with emphasis first on the experimental phenomena and with the mathematical proof in a separate appendix. Footnotes from the literature and an abundant index make the volume one of great reference value also.

Science News Letter, June 3, 1939